

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	41	haldorsen.in.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 07:32
L3	12	(haldorsen near jak\$).in.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 07:30
L4	3048	(filter or filtering) same (attenuate with (noise or interference or borehole adj1 borne))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 08:24
L5	6	("5555530" "5971095" "6446008").PN.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 08:09
L6	153700	(migrating or migration or ('time' adj1 correction))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 08:10
L7	36882	beamforming or beamformer or beam adj1 (forming or former or form) or beamform	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 08:11
L8	4	4 and 6 and 7	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 08:13
L9	1567	367/25.ccls. or 367/34.ccls. or 367/38.ccls. or 367/43.ccls. or 367/50.ccls. or 702/6.ccls. or 702/17.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 08:18
L10	27527	(filter or filtering) same ((attenuate or eliminate or reduce) with (noise or interference or borehole adj1 borne))	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 08:24
L11	104	9 and 10	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 08:29
L12	11225	(location or position) near3 (reflector\$1)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 08:29
L13	10	11 and 12	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 08:33

L14	1043	367/25-35.ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 08:33
L15	14	11 and 14	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 09:05
L16	81	9 and 12	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2005/05/19 09:05

Current session 19/05/2005

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19/05/05 14*40*09

Last connection: 05/05/05 17*58*24

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Now charging Subaccount MIGRATION

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Query/Command : file tulsa, georef

ER 6

GEOREF

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..FILE / ..INFO / ..GUIDE

Query/Command : file tulsa

Subaccount MIGRATION

QUESTEL - Time in minutes : 0,36

The cost estimation below is based on Questel's
standard price list

Estimated cost :	0.38 USD
Cost estimated for the last database search :	0.38 USD
Estimated total session cost :	0.38 USD

Main Account

QUESTEL - Time in minutes : 0,51

The cost estimation below is based on Questel's
standard price list

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Cost estimated for the last database search :	0.55 USD
Estimated total session cost :	0.55 USD

Selected file: TULSA

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Search statement 1

Query/Command : migration or migrating

Frequency	Term
27569	MIGRATION
1227	MIGRATING

**** SS 1: Results 28.138**

Search statement 2

Query/Command : filter or filtering

Frequency	Term
12545	FILTER
6732	FILTERING

**** SS 2: Results 15.750**

Search statement 3

Query/Command : beamformer or beamforming

Frequency	Term
13	BEAMFORMER
43	BEAMFORMING

**** SS 3: Results 48**

Search statement 4

Query/Command : 1 and 2 and 3

**** SS 4: Results 1**

Search statement 5

Query/Command : PRT SS 4 MAX 1

1 / 1 TULSA - ©TULS**Accession Number :**

802253

Title :MULTIPLE ATTENUATION USING **BEAMFORMING** ONSHORE AND OFFSHORE
CHINA**Author :**

HU, T; HONG, F; WANG, R; LI, G; WEN, S

Organiz. Source :PEKING UNIV; PETROLEUM UNIV, BEIJING; CHINA NATIONAL PETROL CORP;
CHINA NAT OFFSHOR OIL CORP**Source :**

LEADING EDGE V 21, NO 9, PP 906-910, SEPT 2002

Numbers :

ISSN 1070485X

Language :

ENGLISH; (ENG)

Index Terms :CHINA*; ASIA*; ATTENUATION*; EURASIA*; GEOLOGIC STRUCTURE*;
IMAGING*; MULTIPLE REFLECTION*; NOISE REDUCTION*; REFLECTION
(SEISMIC)*; SEISMIC WAVE PROPAGATION*; WAVE ATTENUATION*; WAVE
PHENOMENON*; WAVE PROPAGATION*; ADMINISTRATION; AMPLITUDE;
ANALYTICAL METHOD; AZIMUTH; BUSINESS OPERATION; CALCULATING;
COHERENT NOISE; COMMON DEPTH POINT METHOD; COMMON REFLECTION
POINT; COMPUTING TIME; COST CONTROL; DAGANG OIL FIELD; DATA
PROCESSING; DIP; DIP MOVEOUT; ELASTIC WAVE; ELECTRICAL EQUIPMENT;
ELECTRONIC EQUIPMENT; EXPLORATION; FAULT (GEOLOGY); FILTERING
(ELECTRICAL); FORWARD MODEL; FREQUENCY; GEOPHYSICAL
EXPLORATION; INSTRUMENT; LAND; LOW FREQUENCY; MAN MADE NOISE;
MANAGEMENT; MARINE EXPLORATION; MATHEMATICS; MIGRATION;
MIGRATION (SEISMIC); MODEL; MOVEOUT; MULTIPLE CHANNEL RECORDER;
MULTITRACE ANALYSIS; NOISE; NORMAL MOVEOUT; NORTH PACIFIC
OCEAN; OFFSET; OFFSHORE; PACIFIC OCEAN; PHYSICAL PROPERTY;
PRIMARY REFLECTION; RANDOM NOISE; RECEIVER (ELECTRONIC);
RECORDER; REEF; REVERBERATION; SEAS AND OCEANS; SEISMIC DATA
PROCESSING; SEISMIC EXPLORATION; SEISMIC NOISE; SEISMIC REFLECTION
METHOD; SEISMIC VELOCITY; SEISMIC VELOCITY COMPUTATN; SEISMIC
WAVE; SOUTH CHINA SEA; SPATIAL FREQUENCY; STACKING (SEISMIC);
TESTING; THIN BED MULTIPLE REFLECTN; THRUST FAULT; TIME; TRACE

ANALYSIS (ELECTRIC); TRAVEL TIME; TWO DIMENSIONAL SEISMIC;
VELOCITY; WAVE; WAVE AMPLITUDE; WAVE FREQUENCY; WAVE
PROPERTY; WAVE VELOCITY; WAVEFORM

Main Heading :

CHINA*

Category Codes :

GEOPHYSICS

Abstract :

Strong multiples generated by a coral reef can be identified from a 2D, 4-s common offset section recorded in the offshore South China Sea. In order to reject these multiples with reasonable computation effort, **beamforming** multiple attenuation was applied by using overlap reject bands. The offshore results show that this method can attenuate some very strong multiples and enhance weak primaries. Multiple attenuation, a long-standing challenge in seismic processing, is particularly difficult in areas of complex geology. **Beamforming** has been developed especially to handle cases in which preserving amplitude and/or top muted prestack data is important. Minimum variance unbiased (MVU) **beamforming** is a multichannel **filter** which extracts seismic reflection signals without distortion, while minimizing residual noise power. The key concept behind **beamforming** multiple attenuation is to separate primaries and multiples in terms of the difference of their moveout. For the purpose of better describing primaries and multiples recorded in deep 3D data, the normal moveout curves of primaries and multiples are updated by four parameters: two-way traveltimes at zero offset, velocity, dip angle, and azimuth.

Publication Year :

2002

Search statement 5

Query/Command : his

File : TULSA

SS Results

1	28138	MIGRATION OR MIGRATING
2	15750	FILTER OR FILTERING
3	48	BEAMFORMER OR BEAMFORMING
4	1	1 AND 2 AND 3

Search statement 5

Query/Command : borehole

**** SS 5: Results 37.735**

Search statement 6

h eb e e f e e e e e b h h

Query/Command : his

File : TULSA

SS Results

1	28138	MIGRATION OR MIGRATING
2	15750	FILTER OR FILTERING
3	48	BEAMFORMER OR BEAMFORMING
4	1	1 AND 2 AND 3
5	37735	BOREHOLE

Search statement 6

Query/Command : 1 and 3 and 5

**** SS 6: Results 0**

Search statement 7

Query/Command : his

File : TULSA

SS Results

1	28138	MIGRATION OR MIGRATING
2	15750	FILTER OR FILTERING
3	48	BEAMFORMER OR BEAMFORMING
4	1	1 AND 2 AND 3
5	37735	BOREHOLE
6	0	1 AND 3 AND 5

Search statement 7

Query/Command : beamforming or beamforming or beamsteering or beamsteer

Frequency Term

43	BEAMFORMING
43	BEAMFORMING
1	BEAMSTEERING
0	BEAMSTEER

**** SS 7: Results 44**

Search statement 8

Query/Command : beamforming or beamformer or beam w/1 steering

Frequency	Term
43	BEAMFORMING
13	BEAMFORMER
3436	BEAM
3603	STEERING

**** SS 8: Results 69**

Search statement 9

Query/Command : his

File : TULSA

SS Results

1	28138	MIGRATION OR MIGRATING
2	15750	FILTER OR FILTERING
3	48	BEAMFORMER OR BEAMFORMING
4	1	1 AND 2 AND 3
5	37735	BOREHOLE
6	0	1 AND 3 AND 5
7	44	BEAMFORMING OR BEAMFORMING OR BEAMSTEERING OR BEAMSTEER
8	69	BEAMFORMING OR BEAMFORMER OR BEAM W/1 STEERING

Search statement 9

Query/Command : 5 and 8

**** SS 9: Results 2**

Search statement 10

Query/Command : PRT SS 9 MAX 1

*1/2 TULSA - ©TULS***Accession Number :**

617652

Title :AN ACOUSTIC SONDE TRANSDUCER ARRAY AND METHODS OF BEAM
STEERING AND FOCUSING**Author :**

SCHMIDT, M G; PRIEST, J F

Organiz. Source :

WESTERN ATLAS INTERNAT INC

Source :

GR BRIT 2,287,789A, P 95.09.27, F 95.03.22, PR US 94.03.22 (APPL 216,648) (G01V-001/40; B06B-001/06) (66 PP; 56 CLAIMS)

Language :

ENGLISH; (ENG)

Document Type :

(P) PATENT

Patent Number :

GB2287789 A

Patent Date :

1995-09-27

Application Info. :

19950322

Priority Info. :

US 216,648 19940322 [1994US-0216648]

International Classif. :

G01V-001/40; B06B-001/06

Index Terms :

ELECTROACOUSTIC TRANSDUCER*; ELASTIC WAVE LOGGING*; FOCUSING*; INSTRUMENT*; PIEZOELECTRIC TRANSDUCER*; SONDE*; SONIC LOGGING*; SOUND WAVE SOURCE*; TRANSDUCER*; WAVE FOCUSING*; WAVE SOURCE*; WELL LOGGING*; ABSORPTION; ACOUSTIC RECEIVER; ACOUSTICS; ARRAY; ATTENUATION; BLOCK DIAGRAM; BOREHOLE IMAGING; CARBON; CASINGS; CEMENT BOND LOGGING; CHART; CIRCUIT; COEFFICIENT; COMPARTMENT; COMPOSITE MATERIAL; CONSTRUCTION MATERIAL; DAMPER; DAMPING; DETECTION; DETECTOR; DIAGRAM; DIP LOGGING; ELASTIC WAVE; ELECTRIC CIRCUIT; ELECTRICAL EQUIPMENT; ELECTRONIC EQUIPMENT; ELECTRONICS; ELEMENT (CHEMICAL); ENGINEERING DRAWING; EQUALIZING; EQUIPMENT LAYOUT; FORMATION EVALUATION; GROUP IVA; IMAGING; INTENSITY; INTERPRETATION; LOGGING THROUGH CASING; LOGGING WHILE DRILLING; MATHEMATICS; MECHANICAL PROPERTY; MECHANICAL STRENGTH; MOUNTING; MULTIPLE; NOISE REDUCTION; PATTERN; PHYSICAL PROPERTY; RECEIVER (ELECTRONIC); REMOTE SENSING; REMOTE SENSOR; SORPTION; SOUND WAVE; SPACING; SUBSURFACE; THERMAL EXPANSION; THERMAL PROPERTY; ULTRASONIC WAVE; ULTRASONICS; WAVE; WAVE ABSORPTION; WAVE ATTENUATION; WAVE INTENSITY; WAVE PHENOMENON; WAVE PROPAGATION; WELL LOGGING EQUIPMENT; WESTERN ATLAS INTERNAT INC; WINDOW

Main Heading :

ELECTROACOUSTIC TRANSDUCER*

Category Codes :

WELL LOGGING & SURVEYING

Abstract :

An acoustic transducer array for a sonde and methods of **beam steering** and focusing are described. The transducer array comprises an annular array of piezoelectric elements on an acoustic attenuating backing which employs the selective use of mechanical and electronic beam focusing, electronic **beam steering** and amplitude shading to increase resolution and overcome side lobe effects. A signal reconstruction technique utilizes independent array element transmission and reception, creating focusing and **beam steering**. The configuration of the transducer array is preferably cylindrical, but may be conical, biconical, convex, concave or may take the form of a number of other suitable geometric configurations. The transducer array may incorporate a transformer block having an array of multiple transformers therein for connection to individual transducer circuits. The transformers may be fixed or may be capable of being mechanically tuned as desired.

Publication Year :

1995

Search statement 10

Query/Command : his

File : TULSA

SS Results

1	28138	MIGRATION OR MIGRATING
2	15750	FILTER OR FILTERING
3	48	BEAMFORMER OR BEAMFORMING
4	1	1 AND 2 AND 3
5	37735	BOREHOLE
6	0	1 AND 3 AND 5
7	44	BEAMFORMING OR BEAMFORMING OR BEAMSTEERING OR BEAMSTEER
8	69	BEAMFORMING OR BEAMFORMER OR BEAM W/1 STEERING
9	2	5 AND 8

Search statement 10

Query/Command : prt ss 9 2 ti so ab

2/2 TULSA - ©TULS

- TI** - POROSITY, PERMEABILITY AND SHEAR STRENGTH (P*2S) CROSS-WELL TOMOGRAPHY EXPERIMENTS OF A NOISY FOUNDATION
- SO** - 2ND SOC EXPLOR GEOPHYS JAPAN ET AL GEOTOMOGRAPHY INT SYMP (TOKYO, JAPAN, 92.11.18-19) PROC V 2, PP 401-416, NOV 1992 (ISBN 4-938493-01-2; 10 REFS)
- AB** - EXPERIMENT AND ANALYSIS OF CROSS-WELL TOMOGRAPHY OF A SEDIMENTARY FOUNDATION WITH VERY HIGH BACKGROUND NOISE AT AN IRON FOUNDRY ARE PERFORMED. HIGH RESOLUTION VELOCITY IMAGES BETWEEN WELLS SEPARATED BY LONG DISTANCES (UP TO 250 M) HAVE BEEN OBTAINED USING LONG SEQUENCES (UP TO 4,095 CYCLES) OF PSEUDO-RANDOM BINARY CODES AT HIGH CARRIER FREQUENCIES (ONE TO 10 KHZ) TO EXCITE

A PIEZOELECTRIC SOURCE IN A WATER-FILLED WELL. TRANSMITTED SIGNALS ARE RECEIVED BY A 24-CHANNEL HYDROPHONE ARRAY IN ANOTHER WELL. **BEAMFORMING** PERFORMED ON COMMON SOURCE GATHER DATA IDENTIFIES THE DIRECTIONS AND ARRIVAL TIMES OF MULTIPLE RAY PATHS AND TUBE WAVES, AND FURTHER ENHANCES THE SIGNAL-TO- NOISE RATIO. USING THE FIRST ARRIVAL DATA TRAVEL TIME INVERSION IS PERFORMED TO OBTAIN THE COMPRESSIONAL WAVE VELOCITY IMAGE USING THE DAMPED LEAST SQUARES METHOD AND RAY TRACING ALGORITHM. ASSUMING THE NORMAL CONSOLIDATION CONDITION, THE POROSITY AND SHEAR STRENGTH IMAGES ARE TRANSFORMED FROM THE COMPRESSIONAL WAVE VELOCITY IMAGE. THE SLIGHT DIFFERENCES IN THE COMPRESSIONAL WAVE VELOCITY IMAGES OBTAINED USING DIFFERENT CARRIER FREQUENCIES CAN BE USED TO DETERMINE THE PERMEABILITY IMAGE OF SEDIMENTS BASED ON THE BIOT THEORY.

Search statement 10

Query/Command : (position or location) (4d) (reflector or interface)

Frequency	Term
16114	POSITION
21037	LOCATION
2419	REFLECTOR
17914	INTERFACE

**** SS 10: Results 174**

Search statement 11

Query/Command : his

File : TULSA

SS Results

1	28138	MIGRATION OR MIGRATING
2	15750	FILTER OR FILTERING
3	48	BEAMFORMER OR BEAMFORMING
4	1	1 AND 2 AND 3
5	37735	BOREHOLE
6	0	1 AND 3 AND 5
7	44	BEAMFORMING OR BEAMFORMING OR BEAMSTEERING OR BEAMSTEER
8	69	BEAMFORMING OR BEAMFORMER OR BEAM W/1 STEERING
9	2	5 AND 8
10	174	(POSITION OR LOCATION) (4D) (REFLECTOR OR INTERFACE)

Search statement 11

Query/Command : 8 and 10

** SS 11: Results 0

Search statement 12

Query/Command : his

File : TULSA

SS Results

1	28138	MIGRATION OR MIGRATING
2	15750	FILTER OR FILTERING
3	48	BEAMFORMER OR BEAMFORMING
4	1	1 AND 2 AND 3
5	37735	BOREHOLE
6	0	1 AND 3 AND 5
7	44	BEAMFORMING OR BEAMFORMING OR BEAMSTEERING OR BEAMSTEER
8	69	BEAMFORMING OR BEAMFORMER OR BEAM W/1 STEERING
9	2	5 AND 8
10	174	(POSITION OR LOCATION) (4D) (REFLECTOR OR INTERFACE)
11	0	8 AND 10

Search statement 12

Query/Command : triangulation and 10

Frequency Term
272 TRIANGULATION

** SS 12: Results 0

Search statement 13

Query/Command : his

File : TULSA

SS Results

1	28138	MIGRATION OR MIGRATING
2	15750	FILTER OR FILTERING
3	48	BEAMFORMER OR BEAMFORMING
4	1	1 AND 2 AND 3
5	37735	BOREHOLE
6	0	1 AND 3 AND 5
7	44	BEAMFORMING OR BEAMFORMING OR BEAMSTEERING OR BEAMSTEER
8	69	BEAMFORMING OR BEAMFORMER OR BEAM W/1 STEERING

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9          2  5 AND  8
10         174 (POSITION OR LOCATION) (4D) (REFLECTOR OR INTERFACE)
11          0  8 AND 10
12          0 TRIANGULATION AND 10

```

Search statement 13

Query/Command : (1 or 2) and 10

** SS 13: Results 36

Search statement 14

Query/Command : 1 and 2 and 10

** SS 14: Results 1

Search statement 15

Query/Command : prt ss 14 fu

1/1 TULSA - ©TULS

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AN - 555316
TI - HYDROCARBON DETECTION WITH AVO (AMPLITUDE VERSUS
    OFFSET)
AU - CHIBURIS, E; LEANEY, S; SKIDMORE, C; FRANCK, C; MCHUGO, S
OS - ECGEO; AMOCO PRODUCTION CO; ROYAL OIL & GAS CORP
SO - OILFIELD REV V 5, NO 1, PP 42-50, JAN 1993 (6 REFS)
NU - ISSN 09231730
LA - ENGLISH; (ENG)
IT - AMPLITUDE VERSUS OFFSET*; DATA PROCESSING*; DIRECT
    HYDROCARBON INDICTR*; EXPLORATION*; GEOLOGY*;
    GEOPHYSICAL EXPLORATION*; INTERVAL VELOCITY*; REFLECTION
    (SEISMIC)*; SEISMIC DATA PROCESSING*; SEISMIC EXPLORATION*;
    SEISMIC REFLECTION METHOD*; SEISMIC STRATIGRAPHY*; SEISMIC
    VELOCITY*; SEISMIC WAVE PROPAGATION*; STRATIGRAPHY*;
    VELOCITY*; WAVE PHENOMENON*; WAVE PROPAGATION*; WAVE
    VELOCITY*; AMPLITUDE; ANALYTICAL METHOD; ASIA; BRIGHT
    SPOT TECHNOLOGY; CHART; COMPARISON; COMPRESSIONAL WAVE
    VELOCIT; DATA; DECONVOLUTION; DENSITY; ELECTRICAL
    EQUIPMENT; ELECTRONIC EQUIPMENT; EQUATION; EURASIA;

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FILTER (ELECTRICAL); GEOPHYSICAL DATA; GRAPH;
 HYDROCARBON POTENTIAL; KNOTT ZOEPPRITZ EQUATION;
 MATHEMATICAL ANALYSIS; MATHEMATICS; MIGRATION;
 MIGRATION (SEISMIC); MULTIPLE REFLECTION; NUMERICAL
 INVERSION; OFFSET; PHYSICAL PROPERTY; PULSE; RECORD;
 REFLECTION COEFFICIENT; REFLECTION RECORD; ROCK DENSITY;
 SATURATION; SATURATION (ROCK); SAUDI ARABIA; SEISMIC DATA;
 SEISMIC PULSE; SEISMIC RECORD; SHEAR WAVE VELOCITY;
 SYNTHETIC SEISMOGRAM; TESTING; THREE DIMENSIONAL; TRACE
 ANALYSIS (ELECTRIC); VELOCITY CONTRAST; VELOCITY FILTER;
 WAVE AMPLITUDE

MH - AMPLITUDE VERSUS OFFSET*

CC - GEOPHYSICS

AB - ADVANCES IN DATA ACQUISITION, PROCESSING AND
 INTERPRETATION NOW MAKE IT POSSIBLE TO USE SEISMIC TRACES
 TO REVEAL MORE THAN JUST **REFLECTOR** SHAPE AND **POSITION**.
 CHANGES IN THE CHARACTER OF SEISMIC PULSES RETURNING
 FROM A REFLECTOR CAN BE INTERPRETED TO ASCERTAIN THE
 DEPOSITIONAL HISTORY OF A BASIN, THE ROCK TYPE IN A LAYER,
 AND EVEN THE NATURE OF THE PORE FLUID. THIS LAST
 REFINEMENT, PORE FLUID IDENTIFICATION, IS THE ULTIMATE
 GOAL OF AVO ANALYSIS. A GENERAL OVERVIEW OF THE
 PROCESSING REQUIREMENTS AND CAPABILITIES OF THE AVO
 PROCESS IS GIVEN. INTERPRETATION EXAMPLES USING REAL DATA
 ARE PRESENTED.

PY - 1993

Search statement 15

Query/Command : his

File : TULSA

SS Results

1	28138	MIGRATION OR MIGRATING
2	15750	FILTER OR FILTERING
3	48	BEAMFORMER OR BEAMFORMING
4	1	1 AND 2 AND 3
5	37735	BOREHOLE
6	0	1 AND 3 AND 5
7	44	BEAMFORMING OR BEAMFORMING OR BEAMSTEERING OR BEAMSTEER
8	69	BEAMFORMING OR BEAMFORMER OR BEAM W/1 STEERING
9	2	5 AND 8
10	174	(POSITION OR LOCATION) (4D) (REFLECTOR OR INTERFACE)
11	0	8 AND 10
12	0	TRIANGULATION AND 10
13	36	(1 OR 2) AND 10
14	1	1 AND 2 AND 10

Search statement 15

Query/Command : 5 and 10

** SS 15: Results 15

Search statement 16

Query/Command : prt ss 15 1-15 ti so ab

1 / 15 TULSA - ©TULS

- TI** - SLOPE TRANSMISSION TOMOGRAPHY FOR **BOREHOLE** POSITIONING
- SO** - 74TH ANNU SEG INT MTG (DENVER, CO, 2004.10.10-15) EXPANDED ABSTR BIOGR V 2, PP 2331-2334, 2004 (PAP NO TOM 1-3; ALSO AVAILABLE ON CD-ROM; 5 REFS)
- AB** - One of the main interests of surface to **borehole** tomography is to reduce the depth-velocity trade off generally encountered in traditional surface seismic inversion. Indeed, direct arrivals recorded in the well can introduce in the process a time-to-depth relation, allowing better **reflector** depth **location** in the **borehole** vicinity. This precious information is reliable only if the well positioning is accurate enough, which is commonly assumed. Such an assumption can be erroneous in some cases and may lead to distortions in tomograms. Tomography must then invert both velocity field and **borehole** location to provide correct results. A traveltimes and slope tomography method is presented allowing joint recovery of both the velocity model and the **borehole** location from surface to **borehole** acquisition geometry. A dedicated application of the slope transmission tomography on a synthetic walk-away data set is proposed, in addition to some criteria in order to assess the quality of the resulting **borehole** location. (Longer abstract available)

2 / 15 TULSA - ©TULS

- TI** - METHOD AND DEVICE FOR DETERMINING THE **POSITION** OF AN **INTERFACE** IN RELATION TO A BORE HOLE
- SO** - WORLD 04/038,177A1, P 2004.05.06, F 2003.10.06, PR FR 2002.10.25 (APPL 0,213,370) (E21B-047/04; G01V-003/30) (35 PP; 23 CLAIMS)
- AB** - A method is described for determining the position, in a formation containing at least one electrolytic liquid, of an interface in relation to a **borehole**. At a first instant, the interface is stimulated with an excitation signal. At a second instant, a response signal is detected, converted by electro-osmosis or electrokinetic coupling effect. If appropriate, the excitation signal is detected after reflection at a third instant. With the three instants and the propagation velocity of the signals, the distance between the interface and the **borehole** is calculated.

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- TI** - SLICKLINE FLUID IDENTIFICATION TOOL

- SO** - GR BRIT 2,359,396A, P 2001.08.22, F 2000.09.19, PR US 1999.09.24 (APPL 405,929) (E21B-047/04) (38 PP; 17 CLAIMS)
- AB** - The technology relates to electronic well logging, more particularly to a method and apparatus for identifying a fluid in a wellbore, using a slickline logging instrument. A down hole slickline tool and system for identifying fluid in a wellbore comprises (1) a fluid sensing component for sensing at least one fluid property and transmitting a data signal containing information describing the sensed property; (2) an electronic circuit for receiving the data signal and transmitting a control signal based on the data signal; and (3) a magnet drag component for receiving the control signal and activating an electromagnet based on the control signal. The sensing component may detect fluid interfaces by resistance, capacitance inductance, acoustics, radiation, pressure, magnetic, electric, or electromagnetic field. The operation of the drag component enables a surface sensor monitoring tension in the slickline to mark the **position** of the **interface** on a trace associated with downhole depth measurement, e.g., by sensing of the line movement downhole and uphole.

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- TI** - OBTAINING AN IMAGE OF AN UNDERGROUND FORMATION
- SO** - WORLD 01/27,657A1, P 2001.04.19, F 2000.10.12, PR EUROPE 1999.10.14 (APPL 99,308,119) (G01V-001/50) (15 PP; 5 CLAIMS)
- AB** - An image of an underground formation around a **borehole** is obtained by activating an omnidirectional source and recording with a three-component receiver the components of the reflected energy; determining from the components the directions from which the energy arrives at the three-component receiver as a function of two-way travel time; selecting a first underground **position**; assuming a **reflector** to be present at position and calculating the arrival direction of a ray extending from the source via the reflector to the receiver and two-way travel time along the ray; accepting the data if the calculated arrival direction is substantially equal to an arrival direction that has the same two-way travel time and attributing the data on the position; and selecting a next position and repeating steps until the last underground position to obtain the image of the underground formation comprising a set of reflectors attributed to positions.

5 / 15 TULSA - ©TULS

- TI** - CONTROLLING CONING BY SENSING A FORMATION FLUID INTERFACE
- SO** - GR BRIT 2,355,477A, P 2001.04.25, F 2000.09.20, PR US 1999.09.28 (APPL 407,597) (E21B-049/00) (35 PP; 25 CLAIMS)
- AB** - A method of detecting a fluid interface in a formation involves drilling a number of micro-boreholes away from the main production **borehole** close to the zone containing the interface. Detectors are permanently implanted in the micro-boreholes. By using transmitters in the production **borehole** or micro-boreholes, signals are sent into the formation that are responsive to the **position** of the **interface**. Processing of the detected signals facilitates monitoring of the **location** of the **interface**, which monitoring allows operation of flow control devices to avoid coning or breakthrough of undesirable fluid into the **borehole**. The

transmitters may be deployed outside the casing in the production well or deployed on a wireline. The transmitters and detectors can consist of either seismic or electromagnetic sources and detectors, and the interface may be a boundary between oil and gas, a boundary between oil and water, a boundary between gas and water, or a boundary between steam and oil.

6 / 15 TULSA - ©TULS

- TI** - METHOD AND SYSTEM FOR DETERMINING THE AZIMUTH POSITION AND DISTANCE OF A REFLECTING SUBSURFACE FORMATION
- SO** - US 6,176,344B1, C 2001.01.23, F 1997.10.27 (APPL 957,889) (G01V-001/40) (8 PP; 9 CLAIMS)
- AB** - Sonic tools are described for **borehole** logging, particularly a method and system for determining the azimuth position and distance of a reflecting subsurface formation outside a **borehole**. The method and system are used for determining the azimuth **position** and distance of a **reflector** or subterranean reflecting surface of a formation bed outside a **borehole**. A monopole transmitter may be used with a monopole/dipole receiver pair, or a monopole transmitter and a dipole transmitter pair may be used with a monopole receiver to determine the azimuth **position** and distance of the **reflector**. Azimuth resolution is improved through use of multiple receiver elements at equal radius about the longitudinal axis of a **borehole** tool or through mathematical rotation of receiver elements.

7 / 15 TULSA - ©TULS

- TI** - MAGNETIC FORMATION EVALUATION BY DIRECTIONAL INDUCTION LOGGING - A MODELING STUDY
- SO** - 5TH SPWLA ET AL WELL LOGGING SYMP OF JAPAN (MAKUHARI, CHIBA, 1999.09.29-30) PROC PAP NO K, 1999 (11 PP; 11 REFS)
- AB** - A modeling study is presented to investigate an ability to evaluate magnetic properties of formations using an induction logging method. Simultaneous R- and X-response observations give complete information about electrical resistivity and magnetic susceptibility rock properties. A directional approach is described for designing the induction tool with tilted transmitting and receiving coils. The spatial resolution and ability to evaluate the formation parameters by using the proposed method are discussed. A prototype of the directional tool and experimental studies, presented earlier, have shown evident results for evaluation of electrical properties and determination of formation orientation. The method can detect the magnetic susceptibility inhomogeneity in addition to the electrical inhomogeneity by using the X-signal. The phenomenon, observed by the theoretical field distribution on X-signal log diagram, reflects the changes in magnetic properties and occurs just at the **location** of the magnetic susceptibility **interface**. Layered formation, **borehole** influence, and invaded zone effect are considered.

8 / 15 TULSA - ©TULS

- TI** - LOW YIELD OIL WELL TESTING - INVOLVES MONITORING OF RECOVERY TIME OF OIL-WATER INTERFACE TO DERIVE OIL

COLUMN HEIGHT

- SO** - USSR 1,754,894-A1, P 92.08.15, F 89.09.01 (APPL 4,733,254) (E21B-047/10) SOVIET PAT ABSTR NO 9332, P 9-H, 93.09.29 (IN RUSSIAN; ABSTRACT ONLY) (AO)
- AB** - ENHANCED EFFICIENCY OF TESTING OF LOW-YIELD OIL WELL WHICH IS WATERLOGGED IS DUE TO COMBINING THE MONITORING OF FLUID LEVEL RECOVERY PROCESS WITH MONITORING OF THE **POSITION** OF THE OIL-WATER **INTERFACE** OF THE FLUID COLUMN IN THE WELL. THE HEIGHT OF THE OIL COLUMN IS DETERMINED, AND ITS MAXIMUM IS USED TO SET THE MOST EFFECTIVE CONDITIONS FOR INDUCING INFLOW OF THE STRATAL FLUID. THE ABOVE IS PRECEDED BY PRELIMINARY LOWERING OF THE FLUID LEVEL IN THE WELL. THE COMPUTATION OF OIL AND WATER FLOW RATES IS CARRIED OUT UNDER OPTIMAL CONDITIONS WITH DOWNHOLE FACE PRESSURE OF 4.2-5.7 MPA AT WHICH THE MAXIMUM AND MINIMUM FLOWS ARE OBSERVED. THESE INDICATE THAT THE PERMEABILITY OF THE STRATUM FOR OIL AND WATER VARIES. THE DIFFERENCES ARE DUE TO FILTRATION AND STORAGE CHARACTERSTICS OF THE COLLECTOR FOR OIL AND WATER PARTS OF THE STRATUM AND TO PHYSICOCHEMICAL PROPERTIES OF OIL AND WATER. ADVANTAGE - THE METHOD ENSURES DETERMINATION OF OPERATIONAL CONDITIONS OF THE WELL WHICH PROVIDES MAXIMUM YIELD OF OIL. (C1993 DERWENT PUBLICATIONS LTD.) (ORIGINAL PATENT NOT AVAILABLE FROM T.U.)

9/15 TULSA - ©TULS

- TI** - A STEAM-ASSISTED GRAVITY DRAINAGE MODEL FOR TAR SANDS : LINEAR GEOMETRY
- SO** - J CAN PETROL TECHNOL V 31, NO 10, PP 14-20, DEC 1992 (10 REFS)
- AB** - A NEW PREDICTIVE MODEL IS PRESENTED FOR GRAVITY DRAINAGE IN TAR SANDS DURING STEAM INJECTION IN LINEAR GEOMETRY, E.G., ALONG HORIZONTAL WELLS. THE MODEL HAS BEEN VALIDATED AGAINST PUBLISHED EXPERIMENTAL DATA. THE MODEL ASSUMES THAT THE STEAM ZONE SHAPE IS AN INVERTED TRIANGLE WITH THE LOWER VERTEX FIXED AT THE PRODUCTION WELL. THE TEMPERATURE PROFILE IN THE OIL IS ASSUMED TO DECLINE EXPONENTIALLY WITH DISTANCE AWAY FROM THE STEAM/OIL INTERFACE, BUT, UNLIKE PREVIOUSLY PUBLISHED MODELS, THE TEMPERATURE DECLINE IS INDEPENDENT OF **POSITION** ON THE **INTERFACE**. AN ENERGY BALANCE IS USED TO DETERMINE THE LATENT HEAT INJECTION RATE FOR STEAM TO EXPAND THE STEAM ZONE, PREHEAT THE FORMATION AHEAD OF THE STEAM ZONE, AND BALANCE HEAT LOSSES TO THE OVERBURDEN. THE ENERGY BALANCE AND OIL PRODUCTION RATE EQUATIONS ARE COMBINED TO YIELD THE STEAM-OIL RATIO FOR THIS PROCESS.
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10 / 15 TULSA - ©TULS

- TI** - METHOD FOR IMPROVING CROSS-**BOREHOLE** SEISMIC SURVEYS
- SO** - GR BRIT 2,236,392A, P 91.04.03, F 90.09.10, PR GR BRIT 89.09.11 (APPL 8,920,504) (G01V-001/40) (13 PP; 9 CLAIMS)
- AB** - A METHOD IS DESCRIBED TO DETERMINE THE **LOCATION** OF A **LAYER INTERFACE** WITHIN A STRUCTURE OF SUBSURFACE FORMATION LAYERS WHICH FUNCTIONS AS A SEISMIC BOUNDARY. THE INTERFACE HAS A SUBSTANTIAL LATERAL EXTENT BETWEEN AT LEAST 2 BOREHOLES EXTENDING THROUGH THE STRUCTURE. ONE **BOREHOLE** IS USED FOR ARRANGING A SEISMIC GENERATOR AND THE OTHER FOR A SEISMIC RECEIVER TO DIRECTIONALLY DETECT ARRIVAL TIMES AND AMPLITUDES. THE METHOD GENERATES SEISMIC P WAVES AT LEAST AT ONE POSITION IN THE ONE **BOREHOLE**, AND DETECTS SEISMIC WAVES AT LEAST AT ONE POSITION AND IN 2 DIRECTIONS, THE AXIAL DIRECTION AND THE RADIAL DIRECTION WITHIN THE OTHER **BOREHOLE**, THEREBY OBTAINING LAYER INTERFACE RELATED STRUCTURE PARAMETERS.

11 / 15 TULSA - ©TULS

- TI** - RADAR MEASUREMENTS WITH A DIRECTIONAL **BOREHOLE** ANTENNA
- SO** - 59TH ANNU SOC EXPLOR GEOPHYS INT MTG (DALLAS, 89.10.29-89.11.02) EXPANDED TECH PROGRAM ABSTR BIOGR V 1, PP 222-225, 1989 (ISBN 0-931830-92-3; PAP NO E/G1 4; 5 REFS; ABSTRACT ONLY) (AO)
- AB** - A DIRECTIONAL **BOREHOLE** ANTENNA HAS BEEN DEVELOPED FOR THE RAMAC **BOREHOLE** RADAR SYSTEM. SEVERAL METHODS PREVIOUSLY USED TO LOCATE FRACTURE ZONES IN ROCK ARE REVIEWED. IN COMPARISON WITH THESE METHODS OF ANALYZING RADAR DATA, THE DIRECTIONAL ANTENNA MAKES IT POSSIBLE TO OBTAIN THE **POSITION** OF A **REFLECTOR** BY MEASURING IN A SINGLE **BOREHOLE**. THE ANTENNA HAS BEEN SUCCESSFULLY TESTED IN THE STRIPA MINE IN CONNECTION WITH THE CHARACTERIZATION AND VALIDATION PROGRAM PRESENTLY IN PROGRESS. FROM THE MEASURED SIGNALS THE ANTENNA SYNTHESIZES THE DIRECTIONAL FIELD IN AN ARBITRARY DIRECTION AS WELL AS AN ELECTRIC DIPOLE FIELD WHICH CAN BE USED FOR PHASE COMPARISON. (LONGER ABSTRACT AVAILABLE) (ORIGINAL ARTICLE NOT AVAILABLE FROM T.U.)

12 / 15 TULSA - ©TULS

- TI** - METHOD FOR DETERMINING THE **POSITION** OF A SUBTERRANEAN **REFLECTOR** FROM A TRAVELTIME CURVE
- SO** - US 4,706,223, C 87.11.10, F 86.08.01 (APPL 891,832) (11 PP; 13 CLAIMS)
- AB** - A METHOD IS DESCRIBED FOR DETERMINING THE **POSITION** OF A SUBTERRANEAN PLANE **REFLECTOR** RELATIVE TO A KNOWN

LOCATION ON THE EARTH SURFACE FROM UNPROCESSED SEISMIC DATA RECEIVED AT A NUMBER OF COLINEAR ACOUSTIC RECEIVER LOCATIONS. A TRAVELTIME CURVE ASSOCIATED WITH THE REFLECTOR IS IDENTIFIED FROM THE SEISMIC DATA. FROM 2 POINTS ON THE TRAVELTIME CURVE, A SIGNAL INDICATIVE OF THE REFLECTOR'S DIP ANGLE IS GENERATED. USING THE DIP ANGLE SIGNAL, SIGNALS INDICATIVE OF THE POSITION OF EACH IMAGED POINT OF THE REFLECTOR ARE GENERATED. THE METHOD ASSUMES KNOWLEDGE OF THE AVERAGE VELOCITY DOWN TO THE REFLECTOR. THE METHOD MAY BE APPLIED TO PROCESS RAW DATA GENERATED DURING A VERTICAL SEISMIC PROFILING OPERATION.

13 / 15 TULSA - ©TULS

- TI** - NEW METHODS FOR LOCATING THE MOVING GAS/WATER BOUNDARY IN UNDERGROUND STORAGE RESERVOIRS
- SO** - 58TH ANNU SPE OF AIME TECH CONF (SAN FRANCISCO, 83.10.05-08) PREPRINT NO SPE-12077, 8 PP, 1983
- AB** - METHODS HAVE BEEN DEVELOPED WHICH PERMIT THE CALCULATION OF THE APPROXIMATE POSITION OF THE MOVING GAS-WATER BOUNDARY IN UNDERGROUND GAS STORAGE RESERVOIRS FROM DATA ON STORAGE PRESSURES AND DISTANT OBSERVATION WELL LIQUID LEVELS. LOCATING THE GAS-WATER BOUNDARY IN UNDERGROUND STORAGE IS IMPORTANT IN THE CONTROL OF GAS BUBBLE GROWTH AND IN MONITORING AGAINST POSSIBLE MIGRATION AWAY FROM STORAGE HORIZON. THE MATHEMATIC PROCEDURES DEVELOPED PERMIT CALCULATION OF GAS-WATER **INTERFACE LOCATION** AS A FUNCTION OF TIME AS IT MOVES Laterally IN RESPONSE TO STORAGE OPERATIONS. REASONABLE RESULTS AND AGREEMENT WITH OBSERVATIONS WERE OBTAINED FROM THE MODEL USING RESERVOIR DATA FROM A LARGE STORAGE FIELD. THE SENSITIVITY OF RESULTS TO POSSIBLE ERRORS IN THE RESERVOIR DATA AND THE EFFECT OF LOCATION OF THE AVAILABLE KEY STORAGE WELL ARE SHOWN TO PROVIDE PRACTICAL GUIDELINES DEFINING LIMITATIONS OF THE MATHEMATIC TECHNIQUE.

14 / 15 TULSA - ©TULS

- TI** - METHOD OF INJECTIVITY PROFILE LOGGING FOR TWO PHASE FLOW
- SO** - U S 4,228,855, C 80.10.21, F 79.06.22 (APPL 51,074); TEXACO INC
- AB** - FLUID INJECTIVITY WITHIN AN INTERVAL IN A WELL BORE IS DETERMINED BY INJECTING INTO THE WELL 2 FLUID STREAMS, ONE OF WHICH FLOWS DOWN THE TUBING AND ONE OF WHICH FLOWS DOWN THE ANNULUS. ONE OF THE FLUID STREAMS CONTAINS A RADIOACTIVE TRACER. THE SUM OF THE 2 FLUID FLOW RATES IS HELD CONSTANT WHILE EACH FLOW RATE IS VARIED AGAINST THE OTHER. AT EACH DIFFERENT PAIR OF FLOW RATES, A STABLE INTERFACE IS FORMED BETWEEN THE FLUID CONTAINING THE

RADIOACTIVE TRACER AND THE FLUID WITHOUT IT. THE **POSITION** OF THIS STABLE **INTERFACE** AT EACH DIFFERENT SET OF FLUID FLOW RATES IS MEASURED BY A CONVENTIONAL GAMMA RAY WELL LOGGING TOOL, AND FROM THE SERIES OF SUCH MEASUREMENTS AN INJECTIVITY LOG OVER THE MEASURED INTERVAL CAN BE DETERMINED. THE INJECTIVITY PROFILES FOR THE 2 COMPONENTS OF A 2-PHASE FLUID FLOW SYSTEM ARE DETERMINED BY CONDUCTING THE SURVEY WITH A RADIOACTIVE TRACER SOLUBLE IN THE GAS PHASE AND REPEATING THE SURVEY WITH A RADIOACTIVE TRACER SOLUBLE IN THE LIQUID PHASE. (11 CLAIMS)

15/15 TULSA - ©TULS

TI - PROCESS FOR DETERMINING THE **POSITION** OF AN **INTERFACE** SEPARATING TWO LIQUIDS, ESPECIALLY IN A WELL

SO - FR 2,041,957, C 71.02.05, F 69.05.30; GAZ DE FRANCE (IN FRENCH)

Search statement 16

Query/Command : st

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Subaccount MIGRATION.

TULSA - Time in minutes : 17,05

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